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John P. Musone  
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EXAMINER
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MALEKZADEH, SEYED MASOUD

ART UNIT	PAPER NUMBER
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1791

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

## **DETAILED ACTION**

### ***Response to Amendment***

The **proposed amendments**, filed on 05/08/2009, after a final rejection mailed on 04/13/2009, **will not be entered** because the amendments change the scope of the claims and therefore require further consideration and search.

Applicant is appreciated for further clarification of the claimed invention in proposed amendments; however, the proposed amendments would not be entered because the amendment to claims 11 and 15 changes the scope of the claims for the following reason. As also stated by the applicant in remarks filed on 05/08/2009, according to the previous presented claims, the phrase “where no single crystal or directional structure occurs on the substrate” further modifies the substrate; in fact, the claim language is defining applying a metallic intermediate layer on the substrate where no previously single crystal or directional structure was applied on the substrate. However, the clarification in the proposed amendment eliminates this requirement. However, according to the proposed amendment, the claim defines applying a metallic intermediate layer with a non-directional microstructure on the substrate without any further limitation for the substrate.

Moreover, the modification to claim 15 clarifies the heat treatment transforms at least a part of intermediate layer together with the substrate in which the claim language is different from the previous presentation that

require “transforming the intermediate layer including a material which forms the layer”

Thus, the proposed modifications to the claims require reconsideration of the prior arts of record, as well as, possible consideration of the other prior arts would be necessary to determine if the new claim language were not taught or suggested by the prior arts.

### ***Response to Arguments***

**Applicant’s arguments** filed on 05/08/2009 with the proposed amendments have been fully considered but **were not found persuasive**.

Applicant **argues** that “the modification of Konter with the teaching of Paulonis is improper because it would destroy the functionality of Konter” (See remarks; page 6, lines 12- 13); further, applicant **argues** that “if one were to modify Konter by using the metallic intermediate layer of Paulonis as the filling material, then the metallic intermediate layer could not be selectively etched away and therefore would not function as a fugitive material” (see remarks; page 6, lines 14- 17) Moreover, applicant **argues** that “there is no motivation to modify Konter as taught by Paulonis because that would render the device of Konter unsatisfactory for its intended purpose, and no prima facie case for obviousness has been established for any of the pending claims because all of the rejections rely at least in part on this combination.” (See remarks; page 6, lines 20- 24)

**Applicant's argument** was fully considered but was **not found persuasive** first, however, Konter et al. (US '435) recites “the thermally stable filling material (3) that masks the cooling channel was removed by a process step such as etching or a similar process” (See column 4, lines 1- 4) and further, “the thermally stable filling material (3) consists of a ceramic material based on  $Al_2O_3$  and/ or  $Si_2O_3$  and/ or  $ZrO_2$ ”, Konter et al. (US '435) does not point out the filling material (3) of Konter is fugitive or function as a fugitive material and furthermore, none of the claims actually require the intermediate layer being or not being a fugitive material. Thus, applicant's argument in this matter is not on point. Further, as recited in the previous office action, Konter et al. (US '435) teach a substrate (1) with a single crystal including a plurality of profiles (2), a thermally filling material layer (3) as an intermediate layer over the profiles of the substrate (1), and a mono-crystalline layer (6) as a third layer material formed over the substrate (1) and the intermediate layer (3), wherein the intermediate layer is made of ceramic material, which include a non-directional structure. Thus, the prior art is legitimate to be applied for the rejection of claims 11- 16 and 18- 26. Although Konter et al. (US '435) teach a possible later step of removing the filling material (3), this matter does not disqualify the proper propriety other teachings of the prior art to be applied for the presented rejections.

Furthermore, none of the prior arts present an evidence to show that the teachings of the Konter et al. (US '435) and Paulonis et al. (US '988) are not

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combinable or the modification of Konter ('435) with the teaching of Paulonis ('988) would destroy the functionality of Konter ('435). In fact, as also recited in the previous office action, Paulonis et al. (US '988) teach a strong motivation as recited in column 1, lines 53- 58 of Paulonis et al. (US '988) to improve the quality of the finished joints of the component layers by promoting the homogeneity of the component. As also stated above, as a result of providing the metallic intermediate layer of Paulonis et al. (US '988) for the super-alloy component of Konter et al. (US '435), the homogeneity of the component increases and further, the metallic intermediate layer provides a higher surface quality of the profiles (2).

Moreover, applicant **argues** that "the examiner's stated justification for combining Konter and Paulonis also relies upon a motivation to reduce bonding cycle time and bonding temperature. However, there is no bonding cycle time in Konter et al (US '435) because Konter utilizes a powder deposition process rather than a bonding process" (See remarks; page 6, lines 25- 29)

Applicant's **argument** was fully considered but **was not found persuasive** because although Konter et al. ('435) utilizes a powder deposition process, still, there is a bonding between the intermediate layer and the substrate, however, with different strength, and further through applying the metallic intermediate layer of the Paulonis et al. (US '988) into the component of Konter ('435), the bonding cycle time and bonding temperature reduces.

Applicant further **argues** that "if one were to replace the ceramic intermediate material (3) of Konter ('435) with metallic layer such as in Paulonis by using the seed method of Terkelsen, the resulting intermediate layer will be directionally solidified. This would allow any defect present in the surface of the substrate to grow into the intermediate layer, and subsequently into the top layer" and further the pending claims all include the limitation that the intermediate layer is non-directional, whereas the method of Terkelsen purposefully results in a directionally solidified layer" (See remarks; page 7, lines 16- 23)

Applicant's **argument** was fully considered but **was not found persuasive**. As also recited in the previous office action, Konter ('435) in view of Terkelsen (US '570) and further in view of Paulonis et al ('988) clearly teach a metallic intermediate layer with non-directional structure. All of the three prior arts are within the analogous art. Terkelsen (US '570) teach the provision of a surface composition which enhances the dissolution, in the molten metal of the alloy being cast of undesirable surface compounds which interfere with epitaxy (See column 1, lines 63- 67) and further, the entire seed has a composition with either the depressed melting point or surface film dissolving characteristics. Moreover, it is required that the seed have a crystallographic structure and nature from which epitaxial solidification of the melt can take place, and this would prevent the use of seeds of grossly dissimilar nature. (See lines 26- 32, column 4) Thus, the prior art teaches a structure defect at a

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surface of the substrate in which the single crystal build up layer isolated from the structural defect of the substrate by the intermediate layer wherein the structure defect at the surface of the substrate is not copied into the intermediate layer, and further, Paulonis et al ('988) teach that the intermediate layer is metallic.

Therefore, the **rejection** of claims 11- 16 and 18- 26 is **maintained**.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Seyed Masoud Malekzadeh whose telephone number is 571-272-6215. The examiner can normally be reached on Monday – Friday at 8:30 am – 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven P. Griffin, can be reached on (571) 272-1189. The fax number for the organization where this application or proceeding is assigned is 571-273-8300.

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/SEYED M. MALEKZADEH/

Examiner, Art Unit 1791

/Eric Hug/

Primary Examiner, Art Unit 1791